January 23, 2000

Dr. Michael Murtagh
Chair, Physics Department
Brookhaven National Laboratory

Dear Dr. Murtagh and members of the Search Committee,

I am writing to apply for the STAR staff position advertised in the January 2000 issue of Physics Today. As requested in the advertisement, I have requested letters of reference from Bill Zajc from Columbia, Hank Crawford from UC-Berkeley and Jehanne Simon-Gillo from LANL. These letters should arrive soon under separate cover.

I feel I am very qualified to fill the position as advertised. I have worked in relativistic heavy ion physics for my entire physics career, and I am thoroughly familiar with the field. I have worked on a total of five heavy ion experiments; of those, three have completed data taking and have contributed significantly to the progress of the field. In each case, I have made a strong contribution to the success of the experiment, as detailed in my enclosed resume.

I have considerable experience with data analysis and interpretation, having led the analysis effort for BNL Experiment E878 at the AGS. I also have worked on analysis software development for E896 at the AGS and for PHENIX. Within PHENIX, in addition to working on specific detector-related software, I also have primary responsibility for overall particle identification software as part of the tracking package for the central arms. My primary area of expertise is single hadron spectra, a particularly good match for the strengths of STAR. I have written or collaborated on numerous papers in this area, on topics including pion and kaon spectra, light nuclei production and the interpretation of coalescence data, and the complex physics of antiproton production and the coalescence of heavier antinuclear clusters. My experience includes not just the interpretation of final data, but all steps from raw data to normalized cross sections, including acceptance calculations, particle identification and the correct application of various detector or physics related corrections.

I also have some experience in the reconstruction of the decay of neutral particles from software development for E896. In particular, I am interested in the topic of antihyperon production, and I am very familiar with the current data and interpretation in the mystery of antilambda production in Au interactions at the AGS. This is also a topic which lends itself well to analysis within STAR.

Further, I believe I have the requisite skills to act as the leader of a large scale analysis effort. I have had considerable experience throughout my career in mentoring younger students or postdocs on data analysis. I have demonstrated, particularly at LANL, that I have the skills to organize a group effort—i.e. tracking the success of disparate efforts and establishing goals consistent with the overall priorities of the project, as well as the communications and interpersonal skills required to lead a team effort. With these abilities and an overall familiarity with heavy ion physics, I believe I am well situated to act as a mentor for junior staff working on STAR analysis.

I am currently very active in PHENIX, working on the Multiplicity and Vertex Detector (MVD); my specific responsibilities, detailed in my CV, include serving as construction manager for the detector. With my prior experience in detector construction at Yale and Berkeley, and the knowledge I am gaining by leading the MVD construction effort, I am confident I can be a valuable addition to the STAR project in terms of the development of possible future upgrade paths for the detector and the research program.

In summary, I believe I am well qualified to meet the requirements of the position as detailed in your advertisement. I am looking forward to the exciting physics ahead for all of us in the relativistic heavy ion field, and I would greatly enjoy playing a lead role in the STAR physics program.

Sincerely,

Michael J. Bennett, Ph.D.
(505) 672-4092 (home)
(505) 665-2760 (office)
mjbennett@lanl.gov

MICHAEL J. BENNETT

336 Mimbres Dr. Los Alamos, NM 87544
(505) 672-4092
mjbennett@lanl.gov

Relevant Research Experience

Aug. 1997- present **Laboratory Director's Postdoctoral Fellow, Los Alamos**

• A Director's Postdoctoral Fellow is **a highly competitive and prestigious position at LANL**. Fellows are funded directly by the Laboratory Director and are free to work on any project they choose.

• **Construction Manager for PHENIX Multiplicity and Vertex Detector (MVD).** The MVD is a multi-million dollar detector system, comprising some 30,000 channels of silicon strip and pad detectors and associated readout electronics. The MVD is a critical part of PHENIX, a large-scale high-energy physics experiment to be performed at the new Relativistic Heavy Ion Collider. My duties include: **oversee the quality assurance testing of all components, directing the work of several students**; develop all procedures for construction and installation of the MVD; **perform or oversee complete mechanical construction of the detector**, ensuring quality construction. This responsibility has also included identifying suppliers for various components of the MVD and negotiating purchases/services.

• **Solely developed charged particle identification software** for PHENIX central arm tracking. I have played a major role in the PHENIX Hadron Physics Working Group, showing simulated results from the particle identification software at several collaboration meetings.

• **Generated analysis software to perform PHENIX-wide studies of global observables**. Played a lead role in the PHENIX Global Variables Physics Working Group, including **giving an invited talk** on the topic at a University of Illinois-Chicago workshop and showing simulated results at several collaboration meetings. I have responsibility for the Global Physics web areas.

• **Solely developed an event generator for disoriented chiral condensates** (DCC's) to be used in PHENIX simulations. I am playing a lead role in developing software to identify multiplicity fluctuations in the MVD, using this event generator as a training sample.

• **Performed Glauber-type calculations of the importance of energy loss for J/Ψ and Drell-Yan production in heavy ion collisions**. This is a critical topic in understanding the predicted deconfinement transition in the formation of a quark-gluon plasma. These calculations **help clarify the interpretation of recent, somewhat controversial data from CERN, including the discovery of an error in the original analysis**. This work has led to **two refereed theoretical publications** and several conference presentations.

• I have a lead role in the development of MVD analysis software, including **responsibility for integrating the MVD into the PHENIX geometry object-oriented database**.

• I play a lead role in the development of the calibration scheme of the MVD, and expect to retain **a crucial role in the effort to install and commission the detector**.

Aug. 1995- **Postdoctoral Research Physicist, University of California-Berkeley**
Aug. 1997 **Space Sciences Laboratory**

• **Played crucial role in construction of Distributed Drift Chamber** (DDC), the primary detector for Experiment E896, including **primary responsibility for quality control in chamber construction**. I was involved in the development of the chamber design as well as the development of fabrication procedures. I had primary responsibility for dealing with purveyors, including procurement of all materials for construction, machining of materials, and fabrication of electronic artwork. I was heavily involved in the actual construction of the chamber, working "hands-on" with all steps of the fabrication procedure.

• **Had sole responsibility for performing analysis of data from Experiment E878**, a collaboration of more than 30 physicists which performed studies of antimatter production, hadron spectra and strange quark matter production in Au + Au collisions. This analysis is now complete, **resulting in 4 refereed publications**.

• **Developed event generator to study the physics of correlations of Λ–Λ pairs**, and a possible Λ–Λ bound or quasi-bound resonance state, in Au + Au events.

• **Had primary responsibility for slow instrument controls** for Brookhaven Experiment E896. This involved writing instrument control software in the

LabVIEW package, and coordinating similar efforts at UCLA, Ohio State and Univ. of Catania (Sicily).

• **Generated pattern recognition code** to quickly and reliably identify vertices of neutral particle decays in the E896 DDC.

1991-1995 **Research Assistant, Relativistic Heavy Ion Group, Yale U.**

•Played a lead role in the running of experiment E878 at Brookhaven National Lab (my thesis experiment). I was **shift leader** for overnight shifts, with **full responsibility for performance of the experiment**. Had **primary responsibility for determining the run plan and physics goals of the Au beam run**.

•**Solely performed the analysis of E878 data** using VAX/VMS and UNIX (AIX) based systems, including writing virtually all of the analysis code.

•**Had primary responsibility for the performance and calibration of the E878 centrality detector**.

•Helped develop, construct and implement a novel beam detector for E878 based on fiber optics

•Helped to develop and implement a laser/fiber optic based calibration system for experiment E864 at Brookhaven National Lab

1987-90 **Undergraduate Research Assistant for Prof. J. F. Schetzina's Solid State Group, N. C. State University**

•Developed Macintosh-based computer control system for photoluminescence apparatus

•Developed methodology for producing laser cavities from thin films

•Performed optical characterization of thin films, including photoluminescence and X-ray diffraction studies

Educational History

Graduate Education:

Entered Yale University in September 1990
Master of Science in Physics received 12/91
Master of Philosophy in Physics received 5/93
Doctor of Philosophy in Physics received 12/95
My PhD thesis was nominated for an American Physical Society Outstanding Thesis Award

Undergraduate Education:

B.S. (with honors, Summa Cum Laude) in Physics in 1990
Carried 4.0/4.0 Cumulative GPA
North Carolina State University, Raleigh, NC 27695
Inducted into ΣΠΣ Physics Honor Society

Completed 3 semesters (7/76-5/77) with 3.09/4.0 GPA, English major
U. S. Naval Academy, Annapolis, MD 21402

High School:

Graduated 1976; Class Valedictorian with 4.0/4.0 GPA
Marion-Franklin High School, 1265 Koebel Rd., Columbus, OH 43207

Teaching Experience

While at Yale, I accrued **5 years of teaching experience**:

1994-95 **Instructor**, Physics 150 (General Physics for science majors)
Led Discussion Sections, Fill-in Lecturer, proctored and graded exams

1993-94 Grade Administrator, Physics 150
Managed Teaching Assistants, Liaison with students, some grading

1992-93 Teaching Assistant, Physics Lab 205-206 (Sophomore level general lab for physics majors) **Introductory lecture**, supervised students in performing various experiments, graded lab reports

1990-92 Teaching Assistant, Physics Lab 165-166 (Sophomore level general lab for science majors) **Introductory lecture**, supervised students in performing various experiments, graded lab reports

Personal Data:

Full Name:	Michael Jennings Bennett
Birth Date:	August 5, 1958
Family Status:	Married since 9/3/83 to Celene T. Bennett; daughter Caitlin, born 3/12/96; son Brian, born 8/20/99
S. S. Number:	279-60-7398
Home Address:	336 Mimbres Dr. Los Alamos, NM 87544 (505) 672-4092
Work Address:	Mail Stop H846, Los Alamos National Lab Los Alamos, NM 87545 (505) 665-2760 FAX: (505) 665-7920
E-mail:	mjbennett@lanl.gov

TALKS AND PUBLICATIONS

PUBLICATIONS (bold face indicates those papers for which I was primary author)

PHENIX

"Measuring Global Observables with PHENIX"
Particle Distributions in Hadronic and Nuclear Collisions, World Scientific (1999)

"The PHENIX Multiplicity and Vertex Detector"
Proceedings of the Quark Matter 99 Conference, to be published as a special Edition of Nuclear Physics A (in press).

"Electron Identification in the PHENIX Experiment Using a Tracking TRD"
Nuclear Physics **A566**, 615 (1994)

"A Transition Radiation Detector Which Features Accurate Tracking and dE/dx Particle Identification"
IEEE Transactions on Nuclear Science **40**, 153 (1993)

E878:

"Centrality Dependence of Antiproton Production in Au + Au Collisions"
Physical Review Letters 75, 3633 (1995)

"Search for New Metastable Particles Produced in Au + Au Collisions at 10.8A GeV/c"
Physical Review Letters **75**, 3078 (1995)

"Antiproton Distributions in Au + Nucleus Collisions"
Physical Review C56, 1521 (1997)

"Light Nuclei Production in Relativistic Au + Nucleus Collisions"
Physical Review C58, 1155 (1998)

"Antiproton Production at 0° in Collisions of 11A GeV/c Au Beams on Au, Cu and Al Targets"
Nuclear Physics A590, 491c (1995)

"Low P_t Particle Spectra and Strangelet Search from Au+Au Collisions: Final Results from BNL-AGS Experiment E878"
Advances in Nuclear Dynamics 4, W. Bauer and H.-G. Ritter, eds., Plenum Press, page 55 (1998)

"Strangelet Search and Antimatter Production as Measured by the E878 Collaboration"
Proceedings of the Heavy Ion Physics at the AGS (HIPAGS 96) conference

"Antiproton Production at 0° at AGS Energies"
Proceedings of the Snowbird 1994 Conference

"Rapidity Distributions of Antiprotons in Si+A and Au+A Collisions"
Nuclear Physics **A566**, 439 (1994)

"High Rate Multiplicity Detector for Relativistic Heavy Ion Collisions"
Nuclear Instruments and Methods in Physics Research A357, 283 (1995)

Theoretical Calculations

"Geometric Parameterization of J/Ψ Absorption in Heavy Ion Collisions"
Physical Review C 59, 2713 (May 1999)

"Initial State Dependence of J/Ψ and Drell-Yan Yields in Nucleus-Nucleus Collisions", proceedings of the Relativistic Heavy Ion Mini-Symposium, Centennial APS Meeting, Atlanta, GA, 1999

"Initial State Energy Loss Dependence of J/Ψ and Drell-Yan in Relativistic Heavy Ion Collisions", to appear in November issue of Physics Letters B

"Antideuteron Production in High Energy Heavy Ion Collisions"
Physical Review Letters **81**, 2417 (31 October 1994)

"Source Size Determination in Relativistic Nucleus-Nucleus Collisions"
Physical Review Letters **73**, 1219 (29 August 1994)

E864

"Antiproton Production in 11.5 A GeV/c Au + Pb Collisions"
Physical Review Letters **79**, 3351 (1997)

"Search for Charged Strange Quark Matter Produced in 11.5A GeV/c Au+Pb Collisions"
Physical Review Letters **79**, 3612 (1997)

E896

"The BNL-AGS Experiment E896"
Advances in Nuclear Dynamics 2, page 19 (Plenum Press, 1996)

"The E896 Experiment: Search for the H-dibaryon"
Proceedings of the Heavy Ion Physics at the AGS (HIPAGS 96) conference

TALKS (bold face indicates invited talk)

Quark Matter 99, Torino, Italy, May 1999
"The PHENIX Multiplicity and Vertex Detector"

Los Alamos P-25 Seminar Series, May 1999
"J/Ψ Production and Collision Dynamics in Heavy Ion Collisions"

APS Centennial Meeting, Atlanta, GA, March 1999
"Initial State Dependence of J/Ψ and Drell-Yan Yields in Nucleus-Nucleus Collisions"

Physics with the Relativistic Heavy Ion Collider, Pre-conference Workshop at DNP, Santa Fe, NM, October 1998
"Overview of RHIC Experiments and Accelerator"

Los Alamos NPP Series, September 1998
"Overview of RHIC Experiments and Accelerator"

Santa Fe Workshop on Perturbative and Non-Perturbative Aspects of the Standard Model, Santa Fe, NM, July 1998
"Physics with Relativistic Heavy Ions: Recent Results and Experimental Outlook"

Los Alamos Student Seminar Series, July 1998
"An Elementary Introduction to Relativistic Heavy Ion Physics and the Quark-Gluon Plasma"

Workshop on Particle Distributions in Hadronic and Nuclear Collisions, University of Illinois-Chicago, July 1998
"Measuring Global Observables with PHENIX"

APS Spring Meeting, Columbus, OH, April 1998
"The PHENIX Multiplicity and Vertex Detector"

14th Winter Workshop on Nuclear Dynamics, Snowbird, UT, January 1998
"Low P_t Particle Spectra and Strangelet Search from Au+Au Collisions: Final Results from BNL-AGS Experiment E878"

St. Mary's College Physics Seminar Series, Berkeley, CA, March 1996
"Search for Strange Quark Matter"

Institute for Nuclear and Particle Astrophysics Seminar Series, Lawrence Berkeley National Laboratory, November 1995

"The Search for the H^0 Particle in BNL Experiment E896"

Quark Matter 95, Monterey, CA, January, 1995
"Antiproton Production at 0° in Collisions of 11A GeV/c Au on Au, Cu and Al targets"

DNP Conference, Williamsburg, VA, October 1994
"Antiproton Production at 0° in Collisions of 11A GeV/c Au on Au, Cu and Al targets"

APS Spring Meeting, Crystal City, VA, April 1994
"Particle Production at 0° in Collisions of 11 A GeV/c Au on Au, Cu and Al targets"

DNP Conference, Asilomar, CA, October 1993
"The Production of $\pi^{+/-}$, $K^{+/-}$ and $p^{+/-}$ in Collisions of 11.7 A GeV/c Au and 14.6 GeV/c Si on Au, Cu and Al targets"

DNP Conference, Santa Fe, NM, October 1992
"Measurement of Particle Production at 0° in Collisions of 11.7A GeV/c Au and 14.6 A GeV/c Si on Au, Cu and Al targets"